Complete Summary

GUIDELINE TITLE

Routine chest radiographs in uncomplicated hypertension.

BIBLIOGRAPHIC SOURCE(S)

Khan A, Davis SD, Aquino SL, Batra PV, Goodman PC, Haramati LB, Leung AN, McLoud TC, Rosado de Christenson ML, Rozenshtein A, White CS, Kaiser LR, Raoof S, Expert Panel on Thoracic Imaging. Routine chest radiographs in uncomplicated hypertension. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 3 p. [13 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Westcott J, Davis SD, Fleishon H, Gefter WB, Henschke CI, McLoud TC, Pugatch RD, Sostman HD, Tocino I, White CS, Yankelevitz D, Bode FR, Critchfield C. Routine chest radiographs in uncomplicated hypertension. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215 (Suppl):627-9.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Uncomplicated hypertension

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Cardiology
Family Practice
Internal Medicine
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of chest radiographs for patients with uncomplicated hypertension

TARGET POPULATION

Patients with uncomplicated hypertension

INTERVENTIONS AND PRACTICES CONSIDERED

X-ray, chest, posteroanterior (PA) and lateral

MAJOR OUTCOMES CONSIDERED

Utility of chest radiographs in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Routine Chest Radiographs in Uncomplicated Hypertension

Variant 1: Mild hypertension: diastolic pressure 90-104 mm Hg.

Radiologic Exam Procedure	Appropriateness Rating	Comments
X-ray, chest, PA and lateral	1	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Moderate or severe hypertension: diastolic pressure 105-114 mm Hg or ≥115 mm Hg.

Radiologic Exam Procedure	Appropriateness Rating	Comments
X-ray, chest, PA and lateral	5	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Hypertension (HTN) is a worldwide epidemic and often called a silent killer. Fifty percent of the population older than 60 years has it. Overall approximately 20% of world's adults have HTN. It is estimated that about 50 million Americans have hypertension but about 30% do not know it.

According to the Joint National Committee on Hypertension, optimal blood pressure for adults is systolic <120 mm Hg and diastolic <80 mm Hg. The four supranormal levels of blood pressure are prehypertension (systolic 120-139 or diastolic 80-89); Stage I (systolic 140-159 or diastolic 90-99); Stage II (systolic $\geq$160 or diastolic $\geq$100); and Stage III (systolic $\geq$180 or diastolic $\geq$110). HTN may be either essential or secondary. Essential HTN is diagnosed in the absence of an identifiable secondary cause. Approximately 95% of American adults have essential HTN, while secondary HTN accounts for fewer than 5% cases. Uncomplicated HTN has no cardiorespiratory symptoms (pain or dyspnea) or signs of complications such as congestive heart failure (CHF), stroke, or transient ischemic attack (TIA).

The major complications of HTN are coronary heart disease, CHF, stroke, atrial fibrillation, and TIA. The assessment of target organ damage is important in evaluating of a hypertensive patient as it provides an indication of the severity of HTN. The usual markers of target organ damage are fundal changes, renal function, and left ventricular hypertrophy. Medical treatment of HTN has been shown to reduce the incidence of complications and mortality.

Several noninvasive tests are used for evaluating of hypertensive patients, including conventional electrocardiogram (ECG), chest radiography, and echocardiography. In practice, the ECG seems to be routinely performed as part of the initial and follow-up examination.

There is disagreement regarding the usefulness of the routine chest radiograph in patients with uncomplicated hypertension (HTN). Hypertensive guidelines do not recommend the chest radiograph in the routine evaluation of uncomplicated HTN, probably because cardiothoracic ratio has been considered as an unreliable investigation in the assessment of left ventricular hypertrophy (LVH) in hypertensive patients. A routine chest radiograph obtained in the hypertensive patient evaluation has been advocated to: 1) screen for unsuspected abnormalities of the lungs and thorax; 2) assess for cardiomegaly; 3) serve as a baseline for future measurement; and 4) assist in patient management. One

study proposed that "a routine chest radiograph is worthwhile in the patient with HTN. It permits recognition of LVH, the stigmata of coarctation, complications of hypertension (pulmonary congestion, aortic enlargement) and provides some prognostic implications about the disease." Other studies have used initial (pretreatment) chest radiographs in HTN patients to measure heart size. Follow-up comparative chest radiographs obtained after medical treatment were used to assess reversal, stability, or progression of the cardiomegaly and LVH. Although radiographic cardiomegaly does not necessarily indicate impaired left ventricular function, a diagnosis of cardiomegaly does seem to have some prognostic value.

Cardiomegaly by chest radiograph was shown to be the best predictor for the eventual development of CHF, and it is associated with increased mortality compared with cases without cardiomegaly. One study reported that cardiomegaly was found in 17% of patients with moderate to severe HTN, compared with 7% of patients with mild HTN. Another study reported that patients with radiographic cardiomegaly have a worse prognosis at any level of blood pressure elevation than those without radiographic cardiomegaly. Cardiomegaly may also be used by cardiologists as an indication to perform additional testing (especially echocardiography). According to a third study, chest radiograph provides important predictive information of associated target organ damage in hypertensive patients. In this study, cardiothoracic ration and dilatation of ascending aorta were useful in predicting LVH and other markers of target organ damage.

However, none of the studies show that the chest radiographic findings directly influence treatment decisions; the patient will still be treated to achieve lower blood pressure regardless of the radiographic findings. Some authors conclude that routine chest radiographs in patients with uncomplicated HTN are of little or no value. Thoracic abnormalities found on routine chest radiographs were usually minor (e.g., old granulomatous disease, calcified or tortuous aorta, pleural thickening, etc). These findings were not useful for treatment decisions or for prognosis. Cardiomegaly on chest radiography does not necessarily indicate impaired left ventricular function. Chest radiography has been shown to have poor sensitivity and specificity for detecting LVH, especially when compared with echocardiography in adults. One study, based on autopsy findings, found chest radiographs to be of limited value; they showed cardiac enlargement in only 7% of patients with autopsy-proven LVH. In this study, echocardiographic examination was found to be the most sensitive, specific, and accurate method of detecting LVH.

Summary

The diagnosis of LVH is important because it identifies patients at risk for developing complications. However, the chest radiography is insensitive for detecting of LVH, and LVH is best detected by echocardiography. It is not clear from the available studies whether the detection of cardiomegaly in hypertensive patients by chest radiography is useful enough to warrant its routine use. Routine chest radiography does not seem to be clearly indicated in uncomplicated HTN. It should probably be reserved for patients with cardiorespiratory symptoms or signs on physical examination or patients with suspected coarctation of the aorta, and possibly in the evaluation of patients with moderate to severe HTN.

Abbreviation

- PA, posteroanterior

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate use of chest radiograph for evaluation of patients with uncomplicated hypertension

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Khan A, Davis SD, Aquino SL, Batra PV, Goodman PC, Haramati LB, Leung AN, McLoud TC, Rosado de Christenson ML, Rozenshtein A, White CS, Kaiser LR, Raoof S, Expert Panel on Thoracic Imaging. Routine chest radiographs in uncomplicated hypertension. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 3 p. [13 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1995 (revised 2006)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Thoracic Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Arfa Khan, MD; Sheila D. Davis, MD; Suzanne L. Aquino, MD; Poonam V. Batra MD; Philip C. Goodman, MD; Linda B. Haramati, MD; Ann N. Leung, MD; Theresa C. McLoud, MD; Melissa L. Rosado de Christenson, MD; Anna Rozenshtein, MD; Charles S. White, MD; Larry R. Kaiser, MD; Suhail Raoof, MBBS

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

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The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® Anytime, Anywhere™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable

Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

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Date Modified: 10/2/2006